



GVPM Advanced Propulsion Overview

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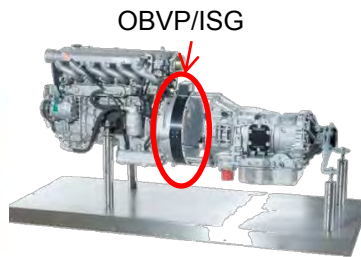
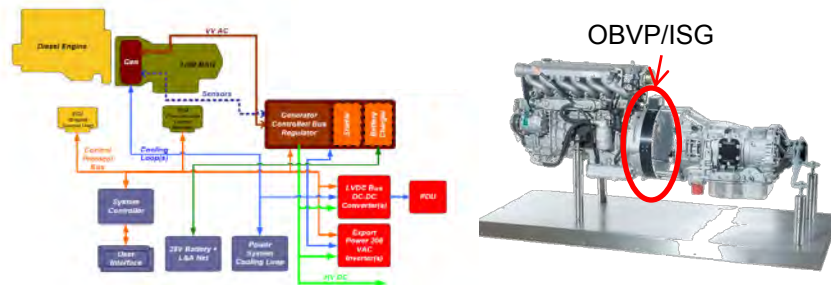
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Advanced Propulsion

Challenges we have:

- Safety and acceptance of high voltage architecture
- Cost of component development
- Availability of production vehicles with advanced propulsion systems
- Integration burden and current power electronics technology robustness

Solutions we are investigating:



- High voltage inline generators for onboard vehicle power (OBVP) on existing combat vehicles
- High temperature power electronics to lower the integration burden of advanced propulsion components
- Testing, Modeling and Simulation of propulsion and power electronics components



- Utilize prototype vehicles to demonstrate utility of full hybrid and OBVP technologies
- Partner with military users to evaluate capabilities offered by advanced propulsion enabled vehicles
- Reliability testing of vehicles to build confidence in the maturity of military hybrid electric

Where we need your help:

- Address high voltage safety in component and system designs
- Reduce cost through increased commercialization
- Collaboration for testing advanced propulsion systems in vehicle platforms.
- Further maturation of high temperature power electronics components

Projects Current & Future

GVSETS
GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM

Vehicle Control Systems Roadmap

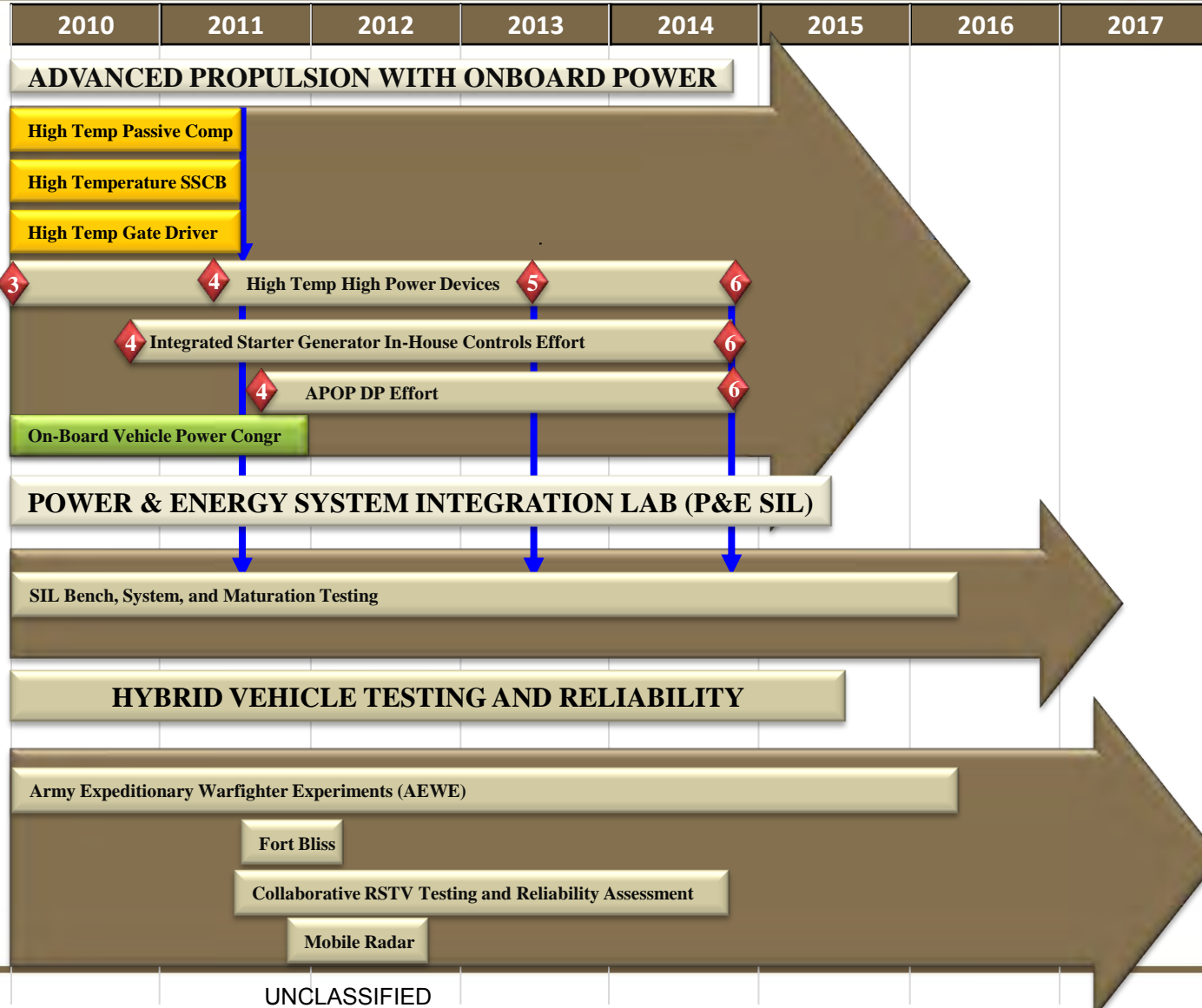
- SBIRs to develop high temperature passive components for power electronics
- SBIRs to develop high temperature solid state circuit breakers and gate drivers
- High temperature power electronics to support advanced propulsion systems
- High torque density and high power density electric motors for OBVP/ISG application operating at high temperatures ($\geq 100^{\circ}\text{C}$)
- On-Board power generation to support increased military power demands and improve military mission effectiveness

Test and evaluation to mature components

1. Bench testing
2. System integration in full hybrid electric propulsion system
3. Vibration and high ambient temperature/in-vehicle

Vehicle Level Testing

1. Warfighter experiment to demonstrate and gain user feedback of advanced technologies
2. Military user assessment of a hybrid electric drive tactical vehicle
3. Demonstrate the Sentinel radar system without the need for a towed generator
4. Assess the reliability of the hybrid electric drivetrain on the RSTV in collaborative effort with GDLS



Laboratory Capability Current & Future

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Current Capability



Hybrid Electric Reconfigurable Movable Integration Testbed (HERMIT)



Cell 10 Motor Dynamometer

AV900 Power Supply

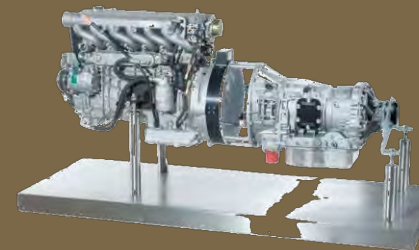
- The HERMIT allows integrated testing of HE components in a vehicle platform
- Cell 10 - electric machine and power electronics bench testing

GSPEL

Ground Systems Power
and Energy Laboratories

**Advanced Propulsion
Roadmap**

Future Capability



ISG test stand



Cell 10 Motor Dynamometer



GSPEL Motor Dynamometer

- ISG Test stand for controls development
- Added capability to test and evaluate multiple electric machines and power electronic components